

### Remarks

In section 2 of the office action the Examiner rejects claims 23 and 39 under 35 USC §112 second paragraph as being indefinite for failing to particularly point out and to distinctly claim the subject matter which the Applicants regard as the invention. The Examiner remarks that the term "broadband" is a relative term which renders the claim indefinite. However, the Applicants respectfully disagree with this interpretation because "broadband" is a commonly used and well understood term by those of ordinary skill in the art as is supported by the extract attached from the Chambers Science and Technology Dictionary which describes "broadband" as a "description of signals, noise, interference, etc. which spreads over a wide range of frequencies". The Applicants therefore respectfully submit that the rejection of claims 23 and 39 under 35 USC §112 second paragraph cannot be sustained.

In section 4 of the office action the Examiner rejects independent claims 23 and 39 under 35 USC §102(b) as being anticipated by Lindemeier (US Patent No. 5,335,010). Reconsideration is requested.

In section 4 of the office action and also in the previous advisory action (mailed April 2, 2004) the Examiner argues that phase shifting a signal is equivalent to delaying it. The Applicants acknowledged in the previous response (filed April 26, 2004) that this is indeed true for a narrowband signal which is essentially at a single frequency but the Applicants respectfully submit that this is not the case for a broadband signal according to the definition given above. This can be clearly demonstrated in the following mathematical analysis:

For a single frequency,  $f$ , the phase delay  $\phi$  corresponding to a given time delay  $\tau$  is given by:  $\phi = 360 \times f \times \tau$

For a broadband signal, with frequencies ranging from  $f$  to  $f + \Delta$ , the phase delay  $\phi_{\min}$  for the lowest frequency  $f$  corresponding to the given time delay  $\tau$  is given by:

$$\phi_{\min} = 360 \times f \times \tau$$

whereas, the phase delay  $\phi_{\max}$  for the highest frequency  $f + \Delta$  corresponding to the given time delay  $\tau$  is given by:

$$\phi_{\max} = 360 \times (f + \Delta) \times \tau$$

A given time delay therefore results in a different phase change for each of the constituent frequencies within the broadband signal.

As demonstrated above, there is no direct correlation between a time delay and a change in phase for the broadband signal because there is a wide range of frequencies within the signal and each frequency experiences a different phase change.

The Applicants therefore respectfully submit that a phase shift is not equivalent to "a delay element in at least one of said received paths" (this application, claim 23) because a phase shifter as described in Lindemeier and a delay element perform different operations when used on a broadband signal. Consequently the present invention as defined by claim 23 is clearly not anticipated by Lindemeier and the Applicants respectfully submit that the rejection of claim 23 under 35 USC §102(b) cannot be sustained.

The Examiner is also directed to the further arguments in the previous response filed on April 26, 2004 which are also applicable.

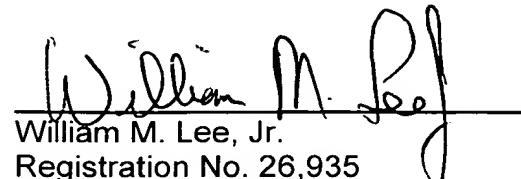
The above arguments in relation to claim 23 are also applicable to independent claim 39 and the Applicants respectfully submit that the rejection of claim 39 cannot also be sustained.

Detailed arguments are not presented in respect of the dependent claims however the arguments of the Examiner should not be taken to be accepted.

In view of the fact that all of the Examiner's comments have been addressed further and favorable consideration is respectfully requested.

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Respectfully submitted,



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**Bristol diamonds** (*Mtr.*). Small lustrous crystals of quartz i.e. rock crystal, occurring in the Bristol district.

**British metal** (*Eng.*). Alloy series of tin (80–90%) with antimony, copper, lead or zinc, or a mixture of these.

**British Association (BA) screw thread** (*Eng.*). A system of symmetrical vee threads of 47½° included angle with rounded roots and crests. It is designated by numbers from 0 to 25, ranging from 6.0mm to 0.25mm in diameter and from 1 mm to 0.07 mm pitch. Used in instrument work, but now being superseded by standard metric sizes. Even numbers are preferred sizes.

**British Columbian pine** (*For.*). See Douglas Fir.

**British Standard brass (BSB) thread** (*Eng.*). A screw thread of Whitworth profile used for thin-walled tubing; it has 26 threads per inch for a given diameter. See British Standard Whitworth thread.

**British Standard fine (BSF) thread** (*Eng.*). A screw-thread of Whitworth profile, but of finer pitch for a given diameter; largely used in automobile work.

**British Standard Institution** (*Govt.*). A national organization for the preparation and issue of standard specifications.

**British Standard pipe (BSP) thread** (*Eng.*). **British Standard gas thread**. A screw-thread of Whitworth profile, but designated by the bore of the pipe on which it is cut (e.g. ½ in Gas) and not by the full diameter, which is a decimal one, slightly smaller than that of the pipe. See British Standard Whitworth thread.

**British Standard specification** (*Govt.*). A specification of efficiency, grade, size etc drawn up by the British Standards Institution; referenced so that the material required can be briefly described in a bill or schedule of quantities. The definitions are legally acceptable.

**British Standard Whitworth (BSW) thread** (*Eng.*). The pre-metric British screw thread, still widely used in the US, having a profile angle of 55 degrees and a radius at root and crest of 0.1373 x pitch; 1/16th of the thread cut off. The pitch is standardized with respect to the diameter of the bar on which it is cut.

**British Standard Wire Gauge** (*Eng.*). See Standard Wire Gauge.

**British Thermal Unit** (*Phys.*). The amount of heat required to raise the temperature of 1 lb of water by 1 Fahrenheit degree (usually taken as 60°–61°F). Abbrev. BTU. Equivalent to 252 calories, 778.2 ft lb, 1055J. 10³ BTU = 1 therm.

**brittle fracture** (*Eng.*). Stress failure occurring suddenly in mild-steel vessels, thought to arise from concentrations of multiple dislocations at the boundaries of the component grains.

**brittle micas** (*Min.*). A group of minerals (the clintonite and margarite group) resembling the true micas in crystallographic characters, but having the cleavage flakes less elastic. Chemically, they are distinguished by containing calcium as an essential constituent.

**brittleness** (*Eng.*). The tendency to fracture without appreciable deformation and under low stress. It is indicated in tensile test by low ultimate tensile stress and very low elongation and reduction in area. The notched-bar test may, however, reveal brittleness in metals that give a high ultimate tensile stress. See toughness.

**brittle silver ore** (*Min.*). A popular name for stibnite. **Brix** (*Chem. Eng.*). Scale of densities used in the sugar industry. Hydrometers are marked in 'degrees Brix', representing the density of a corresponding pure sugar solution in units equivalent to the percentage of sugar in the solution either by volume ('volume Brix') or by mass ('mass Brix').

**BRM** (*Comp.*). See binary-rate-multiplier.

**broach** (*Arch.*). The sloping timber or masonry pyramid at the projecting corner of the square tower from which springs a broach spire.

**broach** (*Build.*). The locating pin, within a lock, about which the barrel of the key passes.

**broach** (*Eng.*). A metal-cutting tool for machining holes, often non-circular; it consists of a tapered shaft carrying transverse cutting edges, which is driven or pulled through the roughly finished hole.

**brochanite**

**broach work** (*Build.*). The finish given to a building-stone by dressing it with a punch so that broad diagonal grooves are left.

**broach spire** (*Arch.*). An octagonal spire springing from a square tower without a parapet, and having the triangular corners of the tower covered over by short sloping pyramids blending into the spire.

**broad** (*Build.*). A wood-turning tool, often consisting of a flat disk with sharpened edges fixed at right angles to a stem; used for shaping the insides and bottoms of cylinders.

**broad (Image Tech.).** A studio light-source giving a wide angle of illumination.

**broadband** (*Telecomm.*). (1) Said of a device (amplifier, mixer, transistor etc.) which is capable of operating with consistent efficiency over a wide range of frequencies. See wideband amplifier. (2) Used as a verb to imply the process of making a circuit or device operate over a wide range of frequencies. (3) Description of signals, noise, interference etc., which spreads over a wide range of frequencies.

**broad-base tower** (*Elec. Eng.*). A transmission-line tower with each leg separately anchored.

**broad beam** (*Radio*). Said of a gamma- or X-ray beam when scattered radiation makes a significant contribution to the radiation intensity or dose rate at a point in the medium traversed by the beam.

**broadcast channel** (*Telecomm.*). Any specified frequency band used for broadcasting; chosen with regard to freedom from mutual and other forms of interference, consistency of propagation and reception, intended range of broadcasting (i.e. local, international, satellite) and bandwidth of programme material (i.e. sound or vision).

**broadcasting** (*Telecomm.*). The transmission of a programme of sound, vision, or facsimile for general reception.

**broadcast standard** (*Image Tech.*). The highest quality of video recording and reproduction, suitable for international broadcast transmission, in contrast to the lower quality acceptable for domestic application.

**broadcast transmitter** (*Telecomm.*). Radio transmitter designed with broadcasting as one of the primary design criteria.

**broadcloth** (*Textiles*). A woollen cloth, woven from fine yarns in a twill weave, heavily milled, and finished with a dress face; originally made in dark colours for suits but now available in pastel shades.

**broadcloth, cotton** (*Textiles*). In US a light-weight poplin shirt fabric.

**broad gauge** (*Civ. Eng.*). A railway gauge in excess of the standard 4 ft 8½ in. (1,435 mm). In particular, the gauge of 7 ft (2,134 mm) laid down by Brunel.

**broad irrigation** (*Build.*). A process of sewage purification in which the effluent is distributed over a large area of carefully levelled land, and allowed to soak through it and drain away an ordinary subsoil water down to natural water-course. Cf. intermittent filtration.

**broadsheet** (*Print.*). (1) The sheet before it is folded. (2) In rotary printing, the size of newspaper printed columns around the cylinder.

**broadside** (*Print.*). A large sheet printed on one side, used as a poster.

**broadside antenna** (*Telecomm.*). Array in which the main direction of the reception or radiation of electromagnetic energy is normal to the line of radiating elements.

**broad-spectrum** (*Med.*). See wide spectrum. Said of drugs.

**broadstone** (*Build.*). An ashlar.

**broad tool** (*Build.*). A steel chisel having a cutting edge 3½ in (90 mm) in width, used for finish-dressing timber.

**brocade** (*Textiles*). Jacquard designed dress or furnishing fabrics. The design is developed by finishing the warp and/or weft threads in irregular order on a simple ground fabric.

**Brean's area** (*Med.*). The left inferior convolution of the frontal lobe of the brain; the 'speech centre'.

**brechianite** (*Min.*). A basic sulphate of copper occurring in green fibrous masses, or as incrustations; occurs in oxidation zones of copper deposits.

**brochure**

**brochure** (*Print.*). A book with its pages set. **Brochurespectre** (*Metac.*). A set Permian strata in N. V. blocks which probably Brocot suspension (h suspension in which a pendulum can be made long (*Build.*). An avi. froglike wavelength (*Ph.*) crests (*Paper*). Wet or paper making or finishing the mill.

**broken colour** (*Build.*). The effects produced by manipulating them using etc.

**broken ends** (*Textiles*). V during weaving.

**broken-over** (*Print.*). Two plates or other separate have been given a narrow they will lie flat and turn broken pieces (*Textiles*). breaking of the wort.

**broken-spaces saw** (*Build.*). tooth to the inch with spaces broken twills (*Textiles*). Line forming the twill is bit direction, at intervals.

**broken worts** (*Ver.*). A circ hems; sometimes associated pulmonary disease.

**brun-cresol green** (*Chem.*). Ion of pH values, suitable brun-cresol purple (*Chem.*). Ion of pH values within Bromeliaceae (*Bot.*). Fam. cotyledonous flowering metidae). Terrestrial and (including tank epiphytes) tropical and subtropical. An The flowers often have ab insect-pollinated. Includes CAM crop-plant) and some bromic acid (*Chem.*). H₂I₂ bromane (*Chem.*). Salts of bromide (*Chem.*). Salts of bromide is extensively used bromination (*Chem.*). The addition of bromine to organic bromine (*Chem.*). A nonmetallic group of the periodic system symbol Br, at no. 35, r.a.m. 85.7, mp –73°C, bp 58.5° liquid, giving off a pungent irritating smell. It combines widely but sparingly with water from which the 'bitters' with extensively in synthetic organic knock additive to motor fuel, quenched Geiger tubes.

**bromochlorofluoromethane** CIP. bp –4°C. Organic extinguishing fluid, particulate spaces. Low toxicity vapour.

**bromiform** (*Chem.*). CHBr<sub>3</sub>, bp 151°C, rel.d. 2.9; a cold colour. Much used in laboratory floors, rel.d. less than 2.9.

**bromell process** (*Image Tech.*). A blanched and tanned bromic pigment which adheres to th repelled by the highlights.